

MM 1.1: Development of diploid cotton cultivars with high fibre quality

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Identification of long fibre length and high fibre strength *G. arboreum* types from germplasm and breeding material coupled with high yield: The *hirsutized* strains like PAIg 29 has been identified. The strain showed promising performance with 23.5 and 22.4% enhanced seed cotton yield in central zone and 44.5 and 22.9% higher seed cotton yield in south zone over common *arboreum* check PA 255 and local *hirsutum* check respectively. The strain also had excellent fibre properties (26.2 mm 2.5% S.L.), fibre strength of 21.0 g/tex and 4.6 micronaire which was at par with *hirsutum* (26.4 mm 2.5 S.L.), fibre strength (20.1 g/tex) and 4.7 micronaire.

Large scale evaluation of quality *arboreums* developed through conventional / introgressed breeding: The strain DELA 3 (1031 kg/ha) having higher seed cotton yield at par with *hirsutum* cotton (1114 kg/ha) alongwith excellent fibre length (27.8) has been identified.

Preliminary evaluation of genotypes of favourable traits of *hirsutum* and *arboreum* cotton through introgression : The strain like PAIg 265 having 51.5% higher seed cotton yield over *hirsutum* check PH 348 with good combination of higher GOT (38.5%) and superior fibre length (27.2 mm) has been identified. Similarly, next best *hirsutized* strain identified was PAIg 299 (2146 kg/ha) having 49% enhanced seed cotton yield over *hirsutum* check PH 348 (1437 kg/ha, 39.6% GOT and 26.6 mm staple length).

Breeding *desi* cotton for low gossypol gland, naked seeded traits suitable for reducing manufacturing cost of oil : The strain viz. PA 594 having better yield and good combination of GOT (36.4%) and a staple length of 24.6 mm has been identified. Identification of *G. herbaceum* types having superior fibre properties from germplasm and breeding material. A strain viz. GBhv 226 having higher seed cotton yield of 33.2 and 22.9% increase over local *arboreum* and *hirsutum* check respectively alongwith superior GOT of 39% and acceptable fibre length of 22.4 mm has been identified. Another best strain in this activity was RBDV 21 which had a good combination of higher yield (17.5 – 27.2%) and better fibre length (24.7 mm) and an average GOT of 34.4%.

Testing of early generation material developed through conventional / introgression breeding: In this activity, more than 600 cultures in early generation were evaluated and more than 2000 single plant selections were made. The introgressed cultures having 2.5% span length ranging from 26-28 mm, fibre strength from 20.3-23.7 g/tex and micronaire value from 4.1 to 4.9 have been identified. In an effort to improve the fibre qualities of north zone, strains having 26.2 mm 2.5% span length, 5.4 micronaire and 18.3 g/tex fibre strength have been isolated from cross of HD 400 x DLSA 17 at Sirsa.

Activity wise progress across different locations

Identification of long fibre length and high strength *G. arboreum* types from germplasm and breeding materials coupled with high yield

Locations (14)	Central Zone : MAU Parbhani, CICR Nagpur, PDKV Akola, MPKV Rahuri, NAU Bharuch, JNKVV Khandwa, MPUAT Banswara South Zone: UAS Dharwad, ANGRAU Mudhol, TNAU Kovilpatti North Zone: RAU Sriganaganagar, PAU, Ludhiana, CCSHAU, Hisar, CICR RS, Sirsa
Experimental Details	
Genotypes	27 + local <i>arboreum</i> check + common <i>arboreum</i> check (PA 255) + local <i>hirsutum</i> check
Design	RBD

Seed Cotton Yield (kg/ha)

Central Zone

- ◆ As many as nine strains over common check, PA 255. Seven strains viz. KWA 25, PAIg 8/1, GBav 110, PAIg 29, PA 531, PAIg 8/3 and PA 8 were significantly superior over *hirsutum* check, NH 545, whereas none of the strains could show significant superiority over local check PA 402 at Parbhani.
- ◆ At Nagpur, five strains viz. MDL 2463, AKA 8, KWA 228, PA 531 and KWA 225 were significantly superior over local *arboreum* check AKA 8401, three strains viz. MDL 2463, KWA 228 and PA 531 over *hirsutum* check Surabhi. None of the strain was superior over common check PA 255.
- ◆ As many as nine strains were significantly superior over common check PA 255, whereas two strains viz. KWA 228 and MDL 2643 over local *arboreum* check, AKA 8 and three strains viz. KWA 228, MDL 2643 and CISA 281 were significantly superior over *hirsutum* check, AKH 8828 at Akola.
- ◆ At Jalgaon, 13 strains were significantly superior over common check PA 255, three strains viz. RG 473, RG 277 and PAIg 8/3 over local *arboreum* check, JLA 794 and none over *hirsutum* check JLH 168 for seed cotton yield.
- ◆ Two strains viz. GBav 106 and GBav 110 over common *arboreum* check PA 255 ; none over local *arboreum* check, G.Cot 19 and as many as 19 strains over *hirsutum* check, G.Cot 16 were significantly superior at Bharuch.
- ◆ At Khandwa, six strains over common check PA 255, four strains over local check J.Tapti and *hirsutum* check JK 4 were significantly superior.
- ◆ At Banswara, as many as nine strains over common check PA 255, 21 strains over local *arboreum* check RG 8 and three strains viz. AKA 101, KWA 228 and RG 277 were significantly superior for seed cotton yield.

South Zone

- ◆ At Dharwad, three strains viz. AH 1, KWA 25, PAIg 29 out yielded over common check, PA 255 whereas none could significantly outyield *arboreum* check, DLSA 17 and local *hirsutum* check Sahana
- ◆ At Mudhol, as many as 11 strains significantly outyielded common *arboreum* check, PA 255. Seven strains were superior over local *arboreum* check Veena and five strains over *hirsutum* check Narsimha.
- ◆ At Kovilpatti, none of the strains except PA 531 out yielded over local *arboreum* check, K 11 common check PA 255 and local *hirsutum* check KC 3.

North Zone

- ◆ None of the strains could significantly outyield all the three checks at Sriganaganagar whereas, 12 strains over common check PA 255 and none over local *arboreum* check, LD 694 and local *hirsutum* check, F 1861 was superior at Ludhiana.

- ◆ Three strains viz. RG 277, HD 463, LD 929 at Hisar and a strain viz. CISA 281 at Sirsa significantly outyielded the common *arboresum* check PA 255 and none over local *arboresum* checks and local *hirsutum* checks at both the locations.
- ◆ In general, on the basis of mean ranking (**Table-1**), the strain PAIg 29 (1216 kg/ha) ranked first followed by PAIg 8/1 (1201 kg/ha), MDL 2463 (1178 kg/ha) and PAIg 8/3 (1143 kg/ha). All these strains except MDL 2463 are introgressed *hirsutized* strains showing better yield performance in central zone. In south zone, JLA 1600 (1201 kg/ha) ranked first followed by PAIg 29 (1116 kg/ha), PA 531 (1044 kg/ha), AKA 0101 (1019 kg/ha) and AH 1 (962 kg/ha). Amongst these five strains, PAIg 29 and AH 1 are *hirsutized* strains. Under North zone conditions, none of the strains could exhibit superior performance than local *hirsutum* (1717 kg/ha) and *arboresum* check (1526 kg/ha).

Ranking of the strains for various zones in respect of yield has been shown in Table 1.1.1.

Mean Ginning Outturn (%) : Mean ginning outturn ranged from 34.3 (RAC 24) to 38.3 per cent (AKA 0210) amongst the strains under testing. The ginning outturn of higher yielding strains of central zone ranged from 35.5 (PAIg 8/3) to 36.0 per cent (PAIg 29). In south zone, the strain AKA 0101 (37.5%) recorded the highest ginning outturn followed by PA 531 (37.3%) and AH 1 (36.9%) .

Table-1.1.1: Ranking of the strains for various zones (Yield kg/ha)

Zone Locations	Rank				
	1	2	3	4	5
Central Zone					
Parbhani	PA 531 (1645)	KWA 25 (1632)	PA 8 (1589)	PA 8/1 (1560)	PAIg 29 (1515)
Nagpur	KWA 228 (883)	MDL 2463 (865)	PA 255 (CC) (843)	PA 531 (839)	Surabhi (749)
Akola	MDL 2643(2160)	KWA 228 (1728)	CISA 281(1587)	RG 473 (1542)	GBav 106 (1527)
Rahuri	RG 277 (838)	RG 473 (814)	PAIg 8/3(811)	JLH 168 (HC)(705)	AH 1 (699)
Bharuch	GBav 110(2352)	GBav 106(2348)	LD 929(2310)	RG 277 (2238)	MDL 2463(2170)
Khandwa	KWA 225(1600)	LD 463(1565)	PAIg 8/1(1560)	GBav 109 (1555)	PA 8 (1448)
Banswara	AKA 0101(446)	KWA 228(434)	RG 277(428)	MDL 2463(405)	GBav 106 (339)
Mean (C.Z.)	PAIg 29(1216)	PAIg 8/1(1201)	MDL 2463(1178)	PAIg 8/3(1143)	L.C. (arb)(1111)
South Zone					
Dharwad	PAIg 29 (1261)	AH 1 (1193)	AKA 0207(1129)	CISA 281(1124)	RG 277 (1121)
Mudhol	JLA 1600(1805)	AK 0101(1639)	PAIg 29(1611)	GBav 109(1574)	PA 531(1555)
Kovilpatti	PA 531 (720)	KC 3 (HC)(634)	PA 255 (619)	AKA 0207(593)	AKA 0210 (560)
Mean (S.Z.)	JLA 1600(1201)	PAIg 29(1116)	PA 531(1044)	AKA 0101(1019)	AH 1 (962)
North Zone					
Sriganganagar	RS 2013 (1872)	LD 929(1626)	RG 8 (1626)	PA 531(1461)	GBav 106(1440)
Ludhiana	F 1861 (HC)(1869)	RG 277 (1427)	LD 694 (LC)(1423)	HD 463(1217)	LD 929 (1207)
Hisar	H 1226 (HC)(1190)	HD 123 (LC) (980)	RG 473(800)	HD 463 (763)	LD 929(650)
Sirsa	RG 8 (LC)(2075)	RS 2013 (HC)(1937)	RG 277(1852)	RG 473 (1817)	LD 929 (1291)
Mean (N.Z.)	JC(1717)	LAC (1526)	GBav 106(1508)	LD 929(1291)	MDL 2463(1151)
Overall mean	HC (1182)	LAC (1178)	GBav 106 (1079)	PAIg 29 (1051)	RG 277 (1049)

Staple Length / Mean Fibre Length (mm) : The mean staple length ranged from 18.7 (RG 277) to 27.0 mm (PAIg 8/1). Amongst the higher yielding strains, PAIg 8/1 recorded the longest staple length followed by PAIg

29 (26.0 mm). The 2.5% span length ranged from 19.7 (CISA 281) to 28.2 mm (RAC 24). As many as 17 strains depicted 2.5% span length above 25 mm. The highest yielding strains JLA 1600 (26.3 mm), PAIg 29 (26.2 mm), AH 1 (26.8 mm) and PAIg 8/3 (26.7 mm) recorded better fibre length above 26.0 mm .

Fibre Strength (g/tex): In general, the values for fibre strength were low during the year under report. It ranged from 14.8 to 21.2 g/tex amongst the strains under testing. Amongst the higher yielding strains, the strains AH 1 (21.1) and PAIg 29 (21.0) recorded superior fibre strength than all the checks.

Micronaire Value: The micronaire value ranged from 4.4 (RAC 24) to 6.6 (RG 277). Amongst the higher yielding strains, PAIg 29 (4.6) had better micronaire value followed by AH 1 (4.7).

Uniformity ratio (%): Most of the strains had good uniformity ratio ranging from 46.4 (RAC 24) to 51.8 (RG 277).

In general, the strain PAIg 29 showed promising performance for yield with 23.5 and 22.4 per cent enhanced seed cotton yield in central zone and 44.5 and 22.9 % higher seed cotton yield in south zone over common *arboreum* check PA 255 and local *hirsutum* checks respectively. The strain also had excellent fibre properties (26.2 mm 2.5% span length, fibre strength 21.0 g/tex and 4.6 micronaire) at par with *hirsutum* (26.4 mm 2.5% span length, fibre strength 20.1 g/tex and 4.7 micronaire) and superior than common *arboreum* check PA 255 (26.4 mm 2.5% span length, fibre strength 19.5 g/tex and 5.2 micronaire) .

Large scale testing of quality *arboreums* developed through conventional / introgressed breeding

Locations (6)	Central Zone : MAU Parbhani, PDKV Akola, MPKV Rahuri, JNKVV Khandwa South Zone : UAS Dharwad North Zone : PAU Ludhiana
Experimental Details	
Genotypes	7+3 at Parbhani, 5+3 at Akola, 6+3 at Rahuri, 7+3 at Khandwa, 4+2 at Dharwad, 7+3 at Ludhiana Checks : Common Check – PA 255, Local <i>arboreum</i> check and Local <i>hirsutum</i> check
Design	RBD

Seed Cotton Yield (kg/ha)

◆ Except Khandwa, results were statistically significant for all the locations. The strain viz. PAIg 27 recorded significant superiority over common *arboreum* check PA 255, local *arboreum* and *hirsutum* checks at Parbhani, whereas none could significantly outyield the check at Akola. Two strains viz. PAIg 8/1 and DELA 3 were significantly superior over all the three checks at Rahuri, whereas the results were non significant at Khandwa.

◆ On an average of four locations in central zone, DELA 3 (1036 kg/ha) recorded the highest seed cotton yield followed by PAIg 8/1 (968 kg/ha) .

◆ At Dharwad (representing south zone), none of the *arboreums* could outyield *hirsutum* check Sahana (1431 kg/ha) and common *arboreum* check, PA 255 (918 kg/ha).

◆ At Ludhiana (North zone), a strain viz. CISA 213 was significantly superior over common *arboreum* check PA 255 whereas none of the strains could show significant superiority over the local *arboreum* and *hirsutum* checks.

◆ In general, the strain DELA 3 (1031 kg/ha) recorded highest seed cotton yield followed by PAIg 8/1 (902 kg/ha).

Mean Ginning Outturn (%) : The mean ginning outturn ranged from 35.4 (AH 65) to 37.6 per cent (JLA 2199 and MDL 2617) amongst the strains under testing. The highest yielding strain PAIg 8/1 (37.0%) recorded better ginning outturn than another higher yielding strain DELA 3 (35.4%).

Staple Length / Mean Fibre Length (mm) : The mean staple length ranged from 23.1 (MDL 2617) to 27.8 mm (DELA 3). Amongst the higher yielding strains, the strain DELA 3 (27.8 mm) recorded the longest staple length followed by PAIg 8/1 (25.5 mm).

In general, the performance of DELA 3 was promising for seed cotton yield and fibre length.

Preliminary evaluation of high quality *arboreum* developed through introgression

Location	MAU, Parbhani
Experimental Details	
Genotypes	27 + 3 (Common check PA 255 + local <i>arboreum</i> check + local <i>hirsutum</i> check)
Design	RBD

Seed Cotton Yield (kg/ha) : Results were statistically significant for seed cotton yield. As many as five strains viz. PAIg 265, PAIg 299, PAIg 255, PAIg 274 and PAIg 296 recorded significant superiority over quality *arboreum* check PA 255 whereas two strains over *arboreum* check PA 402 and fourteen strains over *hirsutum* check PH 348. The percent increase over higher yielding strains ranged from 22.49 to 33.80 per cent over the check PA 255, 38.69 to 51.49 per cent over check, PA 402 and from 38.69 to 51.49 per cent over *hirsutum* check PH 348.

Mean Ginning Outturn (%) : The mean ginning outturn ranged from 37.05 (PAIg 2847) to 42.36 (PAIg 258) per cent. Amongst the higher yielding strains, the strain PAIg 296 (41.07%) recorded highest ginning outturn followed by PAIg 255 (40.08%) and PAIg 299 (39.64%).

Staple Length / Mean Fibre Length (mm) : A range of 24.20 (PAIg 254 and PAIg 274) to 27.90 (PAIg 289) was observed for staple length. The higher yielding strain PAIg 265 recorded better staple length of 27.20 mm. In general, performance of strains PAIg 265 (2177 kg/ha) and PAIg 299 (2146 kg/ha) was promising for seed cotton yield coupled with combination of higher ginning outturn (above 38%) and staple length (above 26.6 mm). (Table 1.1.2)

Breeding naked seeded strains of *desi* cotton with low gossypol gland for reducing manufacturing cost of edible oil

Location	MAU, Parbhani
Experimental Details	
Genotypes	18 + 2
Design	RBD

Seed Cotton Yield (kg/ha) : Results were statistically significant for seed cotton yield. None of the strains could significantly outyield over both the *arboreum* checks viz. PA 255 and PA 402. The strain PA 594 recorded highest seed cotton yield (1780 kg/ha) followed by PA 586 (1710 kg/ha) and PA 678 (1587 kg/ha).

Ginning Outturn (%) : The ginning outturn ranged from 36.20 (PA 679) to 41.49 (PA 703) per cent. The higher yielding strain PA 594 recorded average ginning outturn of 36.41%.

Staple Length / Mean Fibre Length (mm) : The staple length ranged from 24.15 (PA 701) to 26.10 mm (PA 698) amongst the strains under testing.

In general, the naked seeded strain PA 594 exhibited at par yield level as compared to highest yielding check PA 255.

Table 1.1.2 : Testing of high quality *arboreum* developed through introgression

Sl. No	Entry	Seed cotton yield (kg/ha)	% increase over			GOT %	Mean S.L. (mm)
			PA 255	PA 402	PH 348		
1	PAIG 249	1874	15.18	6.78	30.41	38.31	25.80
2	PAIG 254	1776	9.15	1.19	26.59	39.18	24.20
3	PAIG 255	2031	24.83	15.72	41.33	40.81	25.60
4	PAIG 257	1540	-	-	7.16	41.11	25.20
5	PAIG 258	1776	9.15	1.19	23.59	42.36	25.35
6	PAIG 262	1719	5.65	-	19.62	38.75	26.00
7	PAIG 265	2177	33.80	24.04	51.49	38.52	27.20
8	PAIG 274	2013	23.72	14.70	40.08	38.62	24.20
9	PAIG 283	1767	8.60	0.68	22.96	40.24	26.00
10	PAIG 284	1791	10.07	2.05	24.63	37.05	25.70
11	PAIG 285	1111	-	-	-	38.42	25.45
12	PAIG 286	1793	10.20	2.16	24.77	38.32	24.50
13	PAIG 287	1706	4.85	-	18.71	40.92	25.00
14	PAIG 288	1843	13.27	5.01	28.25	40.44	25.10
15	PAIG 289	1666	2.39	-	15.93	38.77	27.90
16	PAIG 290	1778	9.28	1.31	23.72	39.42	24.80
17	PAIG 291	1403	-	-	-	40.36	25.25
18	PAIG 292	1688	3.74	-	17.46	40.89	24.65
19	PAIG 293	1403	-	-	-	38.20	26.10
20	PAIG 294	1632	0.30	-	13.56	38.42	25.60
21	PAIG 295	1657	1.84	-	15.30	37.41	26.55
22	PAIG 296	1993	22.49	13.56	38.69	41.07	26.15
23	PAIG 297	1785	9.71	1.70	24.21	38.40	25.45
24	PAIG 298	1666	2.39	-	15.93	38.98	27.00
25	PAIG 299	2146	31.89	22.27	49.33	39.64	26.60
26	PAIG 300	1726	6.08	-	20.11	39.22	24.35
27	PAIG 301	1778	9.28	1.31	23.72	40.20	25.60
Checks							
28	PA 255	1627	-	-	-	39.19	26.00
29	PA 402	1755	-	-	-	38.72	26.45
30	PH 348	1437	-	-	-	37.38	26.90
	SE/ha	109.5					
	CD/ha	316.4					
	CV %	8.94					

Identification of productive *G. herbaceum* types having superior fibre properties from germplasm and breeding material

Locations (3)	NAU Bharuch, JNKVV Khandwa, MPUAT Banswara
Experimental Details	
Genotypes	8 + 3 (local <i>arboreum</i> check + common <i>arboreum</i> check PA 255 + local <i>hirsutum</i> check)
Design	RBD

Seed Cotton Yield (kg/ha):

- ◆ At Bharuch, four strains viz. RBDV 21, GBhv 226, GBhv 255, GBhv 256 over local *herbaceum* check G.Cot 23 ; none over local *arboreum* check G.Cot 19 and two strains GBhv 226 and GBhv 225 over local *hirsutum* check, G.Cot 16 were significantly superior.
- ◆ At Khandwa, four strains, viz. RBDV 21, RBDV 23, RBDV 24 and GBhv 229 showed significant superiority over common *arboreum* check, PA 255 whereas all the strains except GBhv 256 significantly out yielded local *arboreum* check, J.Tapti. In addition, all the strains showed significant superiority for seed cotton yield over local *hirsutum* check, JK 4.
- ◆ Two strains viz. RBDV 21 and RBDV 23 depicted significantly higher seed cotton yield over common *arboreum* check, PA 255 and local *arboreum* check, G.Cot 17 whereas, only one strain RBDV 21 had significant superiority over local *hirsutum* check, LRA 5166.
- ◆ On an average of three locations, the strain RBDV 21 (1129 kg/ha) recorded highest seed cotton yield with 17.5% increase over local *arboreum* check (961 kg/ha) and 27.5% over local *hirsutum* check (885 kg/ha). This was followed by GBhv 226 (33.2 and 22.91% increase respectively) and GBhv 255 (11.6 and 21.2% increase respectively)

Ginning Outturn (%): A range of 33.6 (GBhv 255) to 38.1 (GBhv 229) per cent was observed amongst the strains under testing. The higher yielding strain viz. GBhv 226 (37.0%) recorded better ginning outturn superior than local *arboreum* (34.0%) and *hirsutum* (33.2%) checks .

Staple Length / Mean Fibre Length (mm): The strain GBhv 256 (25.4 mm) had longest 2.5% span length followed by RBDV 24 (25.0 mm). The higher yielding strain RBDV 21 (24.7 mm) recorded better 2.5% span length and was superior than the strain GBhv 226 (22.4 mm) .

In general, the strain GBhv 226 had higher yield potential alongwith superior ginning outturn (37.0%) and acceptable fibre length (22.4 mm). The strain RBDV 21 possesses good combination of higher yield, better fibre length (24.7 mm) and average ginning outturn (34.4%).

Testing of early generation material developed through conventional or introgression breeding Parbhani

262 cultures derived from conventional and introgression breeding were tested in two replicated trials at Cotton Research Station, Mahboob Baugh Farm, Parbhani. The details of testing and number of single plant selections made during 2006-2007 are given below :

SINo	Experiment No.	Objective	Genotypes used	No. of SPS
1	Experiment 1	Testing of genotypes developed from introgression of favourable traits of <i>G. hirsutum</i> and <i>G. arboreum</i>	219+3 = 222	360
2	Experiment 2	Testing of genotypes having big boll size and good combination of GOT and S.L. derived from conventional breeding method	43+3 = 46	70
				430

The fibre quality parameters of some of the promising breeding lines tested have been presented in Tables 1.1.3 & 4.

Table1.1.3: Fibre quality parameters of some of the cultures developed through introgression breeding method

Sl. No.	Entry No.	Seed cotton yield (kg/ha)	2.5% SL	U.R. (%)	M.V.	Strength (g/tex)	Elong. (%)	SFC
1	5	1650	27.20	51	4.9	23.7	6.4	11.4
2	11	1965	25.40	51	4.7	22.3	6.7	13.9
3	12	1485	27.90	49	4.6	20.0	6.2	10.1
4	23	1639	25.70	51	4.6	20.3	6.2	15.0
5	33	1273	28.10	50	4.5	20.3	6.2	10.9
6	36	862	28.40	50	4.5	21.5	6.4	8.2
7	37	1506	27.70	50	4.1	22.0	6.4	10.5
8	39	1166	27.00	51	4.8	21.1	6.2	12.4
9	43	1615	27.80	49	4.1	21.7	6.5	11.0
10	62	1736	26.90	49	4.6	20.2	6.3	11.4
11	63	1310	27.60	50	4.2	20.8	6.4	9.9
12	67	1409	26.80	50	4.8	21.8	6.5	12.8
Checks								
13	PA 255	1532	25.80	49	4.9	18.5	6.3	17.3
14	PA 402	1275	24.40	53	5.1	18.4	6.3	21.5
15	PH 348	1635	25.50	49	4.8	17.2	5.5	16.3

Table1.1.4: Fibre quality parameters of early generation cultures developed through conventional breeding method

Sl. No.	Entry No.	Seed cotton yield (kg/ha)	2.5% SL	U.R. (%)	M.V.	Strength (g/tex)	Elong. (%)	SFC
1	6	1150	27.10	49	4.5	20.7	6.3	13.9
2	13	1378	27.50	49	4.7	20.0	5.9	9.9
3	46	1468	25.80	51	4.7	20.3	5.8	14.5
4	15	1091	26.00	49	4.9	22.4	6.4	19.9
5	16	1358	24.80	52	5.1	21.3	6.1	16.8
Checks								
6	PA 255	1492	26.20	50	5.0	19.2	6.3	13.1
7	PA 402	1008	24.70	52	4.8	18.7	6.2	17.3

Nagpur

Development and identification of promising cultures

- ◆ The promising cultures CINA 347 and CINA 348 of *Gossypium arboreum* have been identified and developed during 2006-2007 through conventional breeding method.
- ◆ The above cultures have high yield potential (9.0 to 13.0 q/ha), high GOT (upto 38%), big boll size (2.9 to 3.2 g), locule retentivity (17 to 23 days), early maturity (155 to 160 days), long staple (27 to 28 mm), moderate fibre strength (20 to 21 g/tex) and low short fibre content (7.3 to 13%).

Table 1.1.5 : Performance of promising cultures developed through conventional breeding method

S.No.	Name of cultures / varieties	Seed cotton yield (q/ha)	GOT (%)	Staple length (mm)	Bundle strength (g/tex)	Short fibre content (%)	Locule retention (days)	Maturity (days)
1	CINA 347	9.34	38.21	28.2	20.2	7.3	23	155
2	CINA 348	13.29	37.85	27.5	21.0	13.2	17	160
3	AKA 8401 (Check)	8.47	36.19	26.3	19.3	17.8	9	160

New crosses effected

On the basis of fibre traits, boll weight, ginning outturn, yield potential and earliness, 116 genotypes were identified from germplasm of diploid cotton. Fifty-eight new cross combinations involving above elite genotypes of *arboreum* and *herbaceum* were made for further evaluation.

Testing of early generation material

Thirteen single plant selections based on high yield, earliness, high fibre strength and long fibre with locule opening pattern were made. Single plant selections namely, SP 06-07-5, SP-06-07-8 and SP-06-07-9 having better yield potential and mean halo length than AKA 8401 (Check) (Table 1.1.6)

Table 1.1.6 : Performance of single plant selections

S. No	Entries Code	Seed cotton yield / plant (g)	Boll weight (g)	GOT (%)	MHL (mm)	Locule opening pattern*
1	SP 06-07-1	38.3	2.8	37.2	27.3	CML
2	SP 06-07-2	42.1	2.8	36.4	25.8	CML
3	SP 06-07-3	29.5	2.6	36.4	27.7	CML
4	SP 06-07-4	39.7	2.8	37.3	25.3	CML
5	SP 06-07-5	47.5	2.8	34.8	28.2	IML
6	SP 06-07-6	31.3	2.4	37.3	27.3	CML
7	SP 06-07-7	35.7	2.6	37.3	27.7	CML
8	SP 06-07-8	44.3	2.6	37.1	26.9	CML
9	SP 06-07-9	36.8	2.6	36.5	28.5	CML
10	SP 06-07-10	36.3	3.1	37.2	26.8	CML
11	SP 06-07-11	41.4	2.9	35.8	28.7	IML
12	SP 06-07-12	39.2	2.9	37.7	27.1	CML
13	SP 06-07-13	44.5	3.1	35.3	27.6	CML
14	Check AKA 8401	34.7	2.6	36.7	26.5	CML

* CML = Complete movement of locules *IML = Incomplete movement of locules

Akola

Testing of segregating material from F₂ to F₅ generation for selection to evolve high quality *arboreum* and *herbaceum*.

During *kharif* 2006, the interspecific derivatives of *G. arboreum* with *G. raimondii*, *G. anomalum* and *G. herbaceum* population has been evaluated in F₄ generation (61 lines for GOT and staple length). Each line was harvested by selecting desirable types for evaluation during coming season. The top ranking performance has been indicated as below :

Sr. No.	GOT %	Number of plants identified	Sr. No.	Seed Cotton Yield/plant (g)	Number of plants identified
1.	36 – 38	12	1.	50 – 100	10
2.	38 – 40	10	2.	101 – 150	23
3.	40 – 42	6	3.	151 – 200	13
4.	42 – 44	1	4.	201 – 250	4
Sr. No.	Mean Halo Length (mm)	Number of plants identified	Sr. No.	Boll Weight (g)	Number of plants identified
1.	23 – 25	11	1.	2.0 – 2.5	35
2.	25 – 26	5	2.	2.5 – 3.0	16
3.	26 – 27	5			
4.	27 – 28	7			
5.	28 – 30	3			

These identified single plant selections having better performance for GOT, Mean Halo Length and Seed Cotton Yield will be evaluated during coming season and top ranking entries will be selected for further evaluation.

Ludhiana

♦ A total of 30 populations belonging to different filial generations (F₂ to F₄) were evaluated for seed cotton yield, halo length and ginning outturn. A wide variation for these characters was observed. Range for halo length was found to be 14 to 28 mm while seed cotton yield per plant ranged from 7 to 93 gram. Of the 30 populations evaluated, 15 produced segregants having at least 25 mm fibre length. The most productive crosses that threw transgressive segregants for halo length included LD 694 X PAIG 9-8-1 and LD 694 X PAIG 27.

♦ Ten *arboreum* x *herbaceum* interspecific F₂ populations were evaluated, of which three produced segregants with halo length of more than 25 mm.

♦ Fresh crosses involving at least one parent with superior fibre properties were attempted. Performance of some of the promising segregants have been presented (Table 1.1.7).

Table 1.1.7: Performance of some promising segregants for seed cotton yield, halo length and ginning outturn

S.No	Cross	Generation	Halo length (mm)	Seed cotton yield (g)	Ginning outturn (%)
1	LD 694 X PAIG 9-8-1	F ₄	28	28	28.0
			28	19	33.2
			28	16	32.0
			25	83	34.6
			25	44	40.7
2	LD 694 X PAIG 27	F ₄	28	26	35.4
3	685 X 2004 X PAIG 8/1 (<i>G. arboreum</i> x <i>G. herbaceum</i>)	F ₂	28	9	31.6
4	372 X DLSA 17 (<i>G. arboreum</i> x <i>G. herbaceum</i>)	F ₂	28	19.4	29.0
			28	11.0	31.0
5	788 X PAIG 27 (<i>G. arboreum</i> x <i>G. herbaceum</i>)	F ₂	28	20.2	34.4

Hisar

A total of 21 F₂ and F₃ populations of superior fibre quality genotypes were raised in varying plot sizes. Single plant selections having fibre length of more than 23 mm were selected from these crosses.

Sirsa

One hundred and fourteen cultures in early generation were tested and eight promising cultures with staple length above 25 mm as well as strength above 19g/tex were selected.